

# EXHIBIT “E”

# Trilogy EVO Foam

RJ Lee Analysis Review

Prepared by: Ken Cole

May 17, 2021

**EXHIBIT**  
**A**

# BACKGROUND

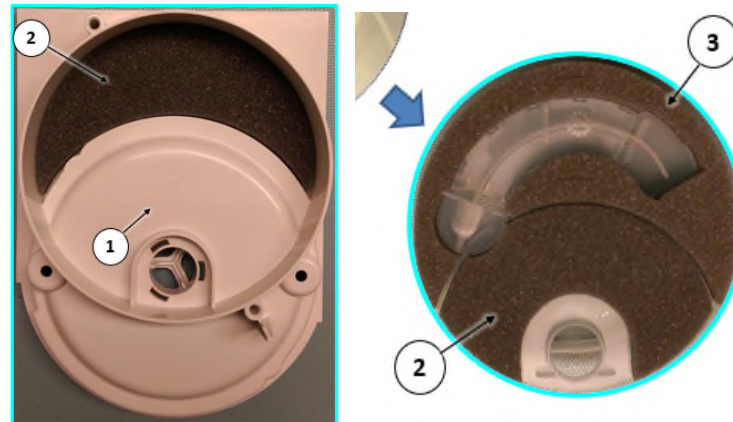
- Trilogy EVO Production Level Parts in Question
  - 1126743 – MUFLER FOAM TOP, HELIX (Rev. 05 Verified)
    - PAF – Acoustic, open cell, flexible **ether-based**, urethane foam
    - 0.375” Thk.
    - BU – Tuffylm Skin (black urethane)
  - 1126744 – MUFLER FOAM MID, HELIX (Rev. 05 Verified)
    - PAF – Acoustic, open cell, flexible **ether-based**, urethane foam
    - 0.500” Thk.
    - BU – Tuffylm Skin (black urethane)
  - 1126745 – MUFLER FOAM MAIN, HELIX (Rev. 05 Verified)
    - PAF – Acoustic, open cell, flexible **ether-based**, urethane foam
    - 0.250” Thk.
    - BU – Tuffylm Skin (black urethane)
  - 1126746 – MUFLER FOAM BASE, HELIX (Rev. 05 Verified)
    - PAF – Acoustic, open cell, flexible **ether-based**, urethane foam
    - 0.375” Thk.
    - BU – Tuffylm Skin (black urethane)

# BACKGROUND

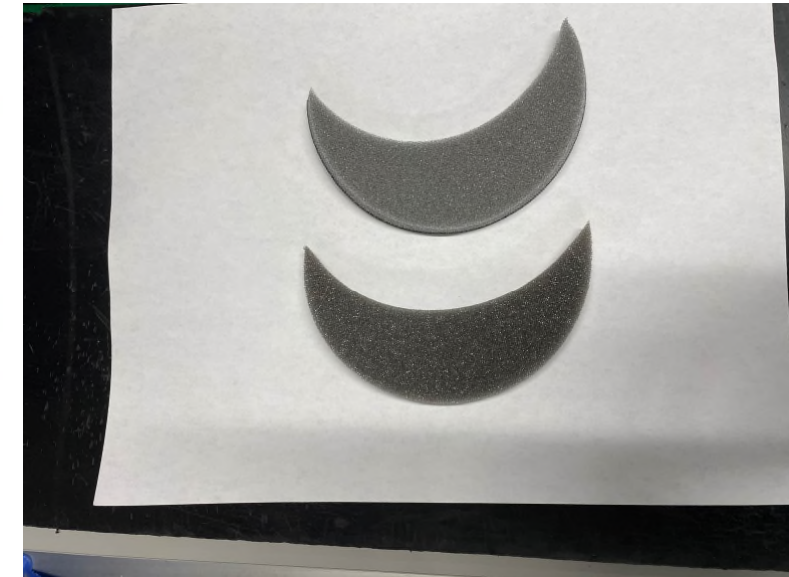
- Investigation prompted by staff observation of color variance across both current production and previous builds.



1126745 – Current production on left, RDT built unit on right (2018)

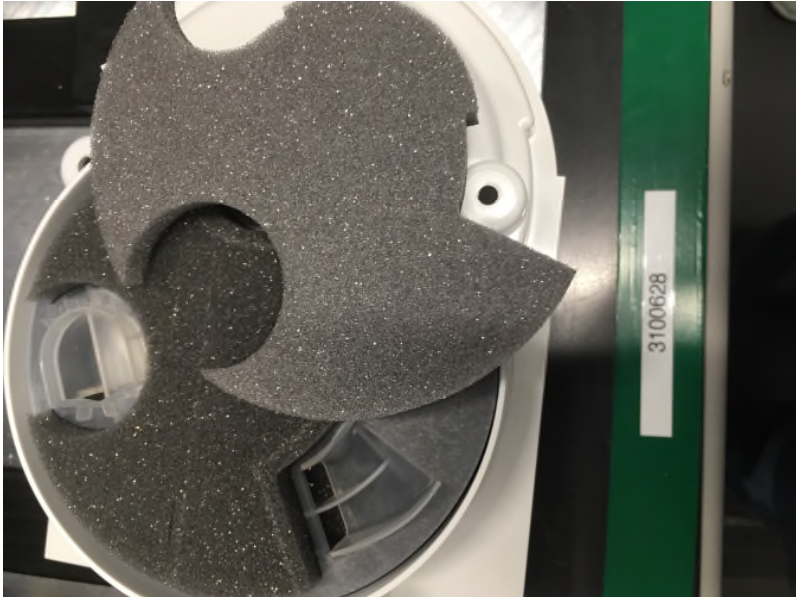


OMS pictures clearly show darker foam than current production. OMS pictures likely taken during Pre-Pilot.

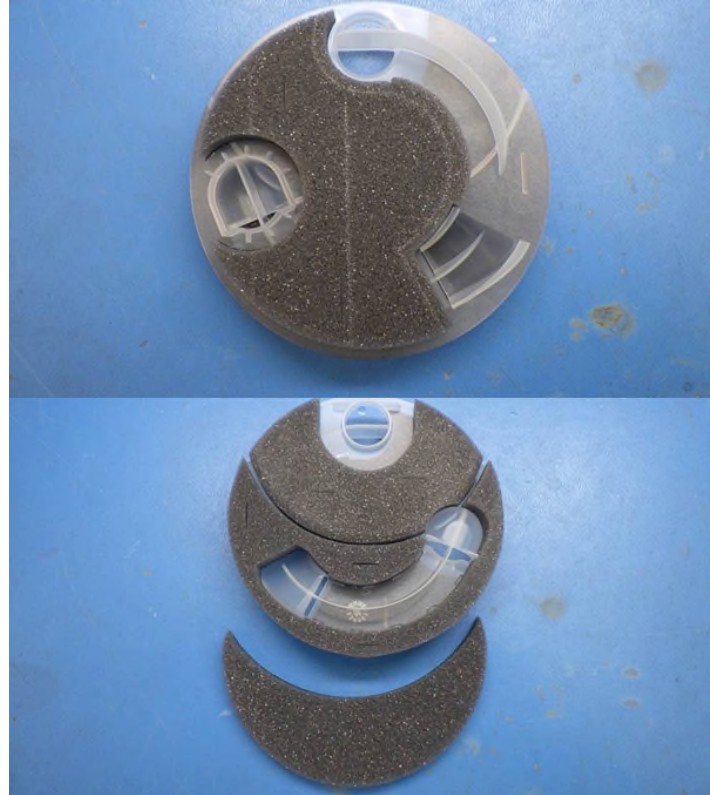


1126746 pulled from production floor, on the same day, from the same lot.

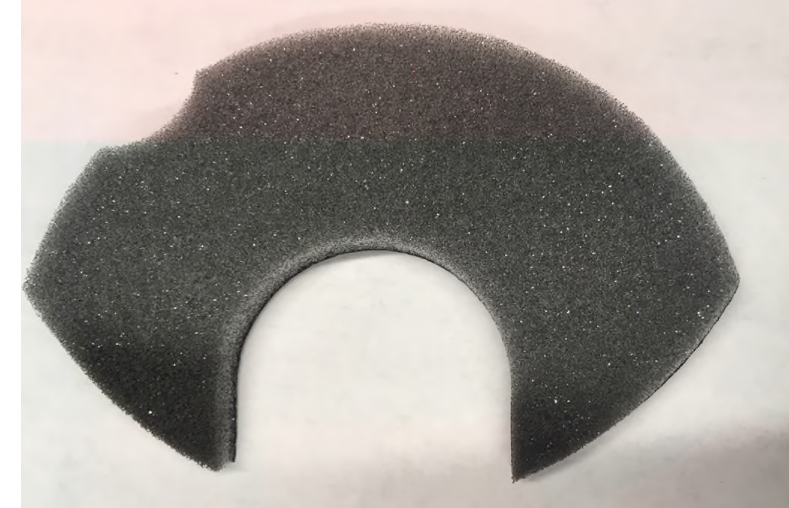
# BACKGROUND



1126743 – Muffler assembly built circa 2018 (dark) compared to current production (light).



Muffler assembly built August of 2019



1126745 – Current production sample taken from line.

# RJ Lee Report Summary

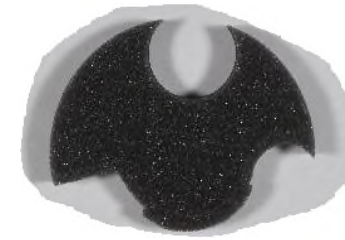
- RJ Lee contracted to test 6 samples of varying color and lineage.
  - SEM-EDS analysis was used to analyze the structure and composition of each foam.
  - FTIR analysis was used to analyze the chemical composition of the samples.



# RJ Lee Report Summary

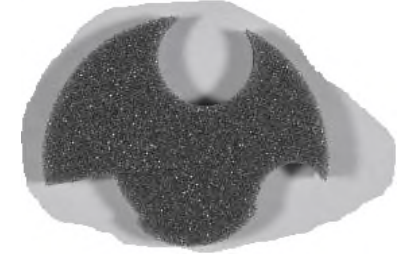
**Table 1** – Sample names and assigned RJLG numbers

RJLG Number	Sample Description
10536800	Older 2018 1126743
10536801	New 5-6-2021 1126743
10536802	RDT 1126743
10536803	New Lighter 5-6-2021 1126746
10536804	New Darker 5-6-2021 1126746
10536805	New 2-Tone 5-6-2021 1126745



Sample taken from production level muffler assembly built in 2018. This unit was never in the field.

Sample taken from current production stock May 2021.



Sample taken from RDT unit, built circa 2018.

Sample taken from current production stock (on the floor) May 2021.



Sample taken from current production stock (on the floor) May 2021.

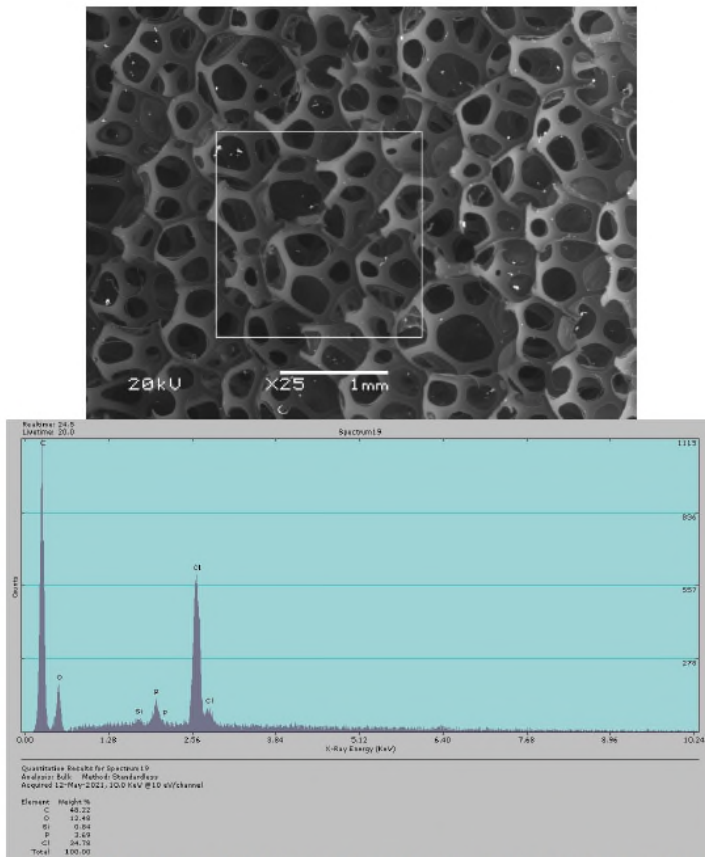


Sample taken from current production stock (on the floor) May 2021.

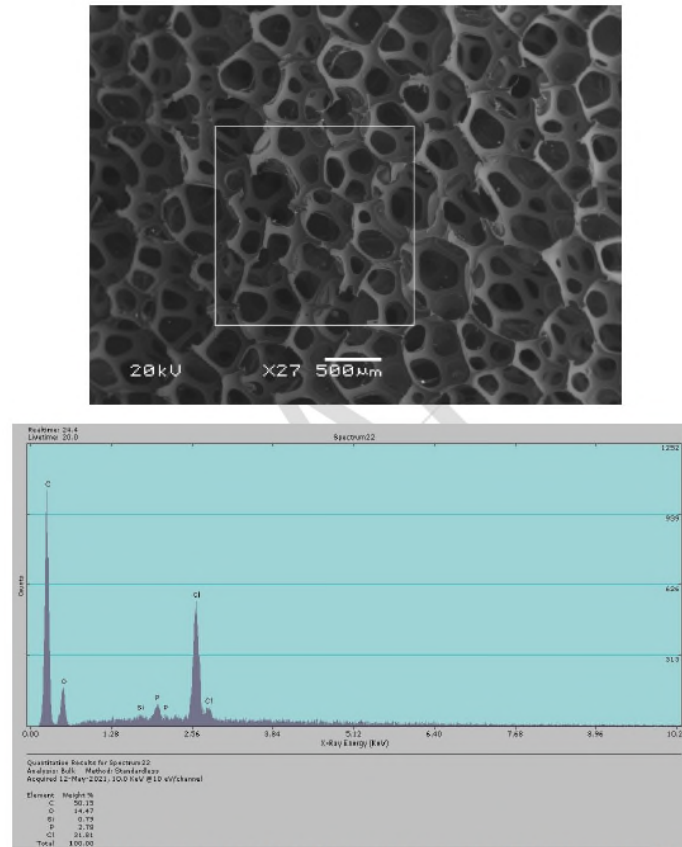
# RJ Lee Report Summary

SEM-EDS Comparison 1126743

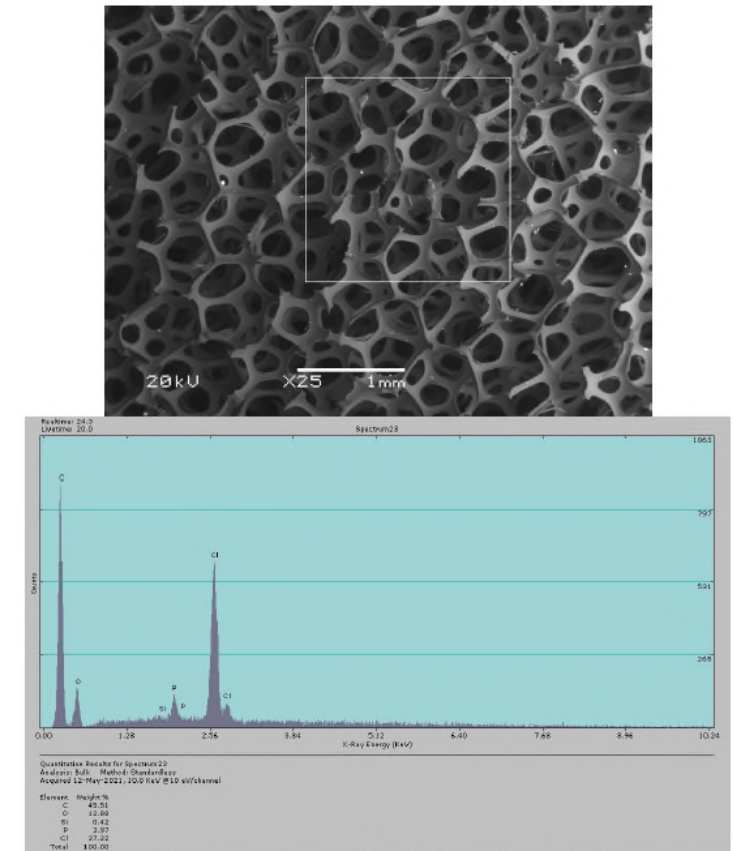
Analysis shows similar cell structure and indicates similar elemental composition.



RJ Lee #10536800 – Sample from 2018  
Ref. Page 4 of RJ Lee Report



RJ Lee #10536801 – Sample from current production  
Ref. Page 6 of RJ Lee Report



RJ Lee #10536802 – Sample from 2018  
RDT Unit  
Ref. Page 8 of RJ Lee Report

WTB 000007



# RJ Lee Report Summary

SEM-EDS Comparison 1126746

Analysis shows differing cell structure and indicates similar elemental composition.

- Indication of poor process control.

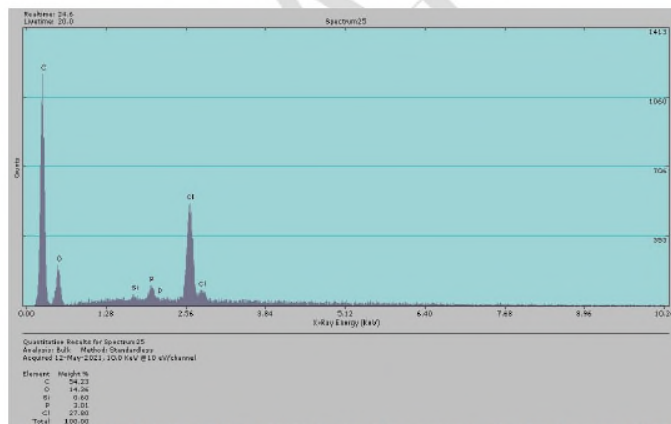
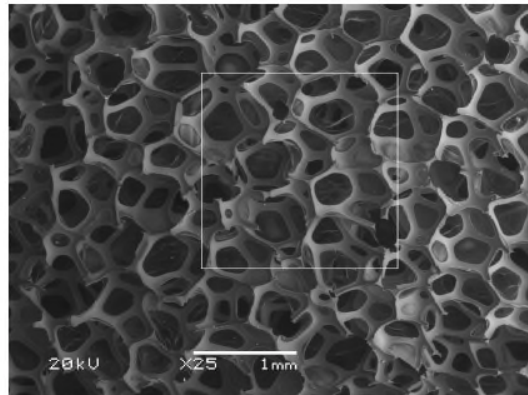


Figure 8 – SEM-EDS analysis of RULG# 10536803. Top: SEM micrograph. White box shows area of EDS analysis. Bottom: EDS analysis showing elemental constituents of the sample.

RJ Lee #10536803 – Sample from current  
production (light color)  
Ref. Page 10 of RJ Lee Report

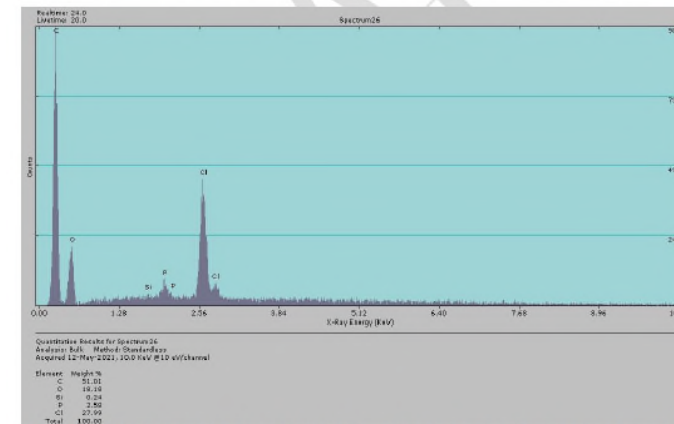
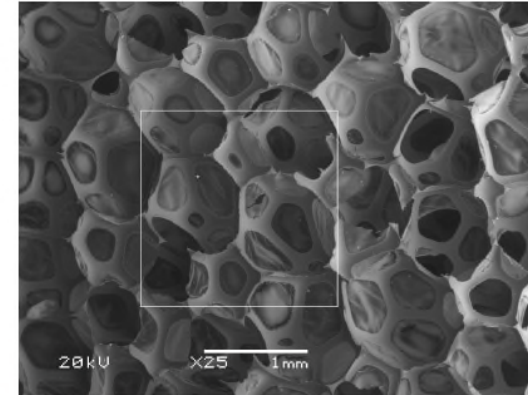


Figure 10 – SEM-EDS analysis of RULG# 10536804. Top: SEM micrograph. White box shows area of EDS analysis. Bottom: EDS analysis showing elemental constituents of the sample.

RJ Lee #10536803 – Sample from current  
production (dark color)  
Ref. Page 12 of RJ Lee Report

# RJ Lee Report Summary

*SEM-EDS Comparison 1126745 Two-Tone Production Part*

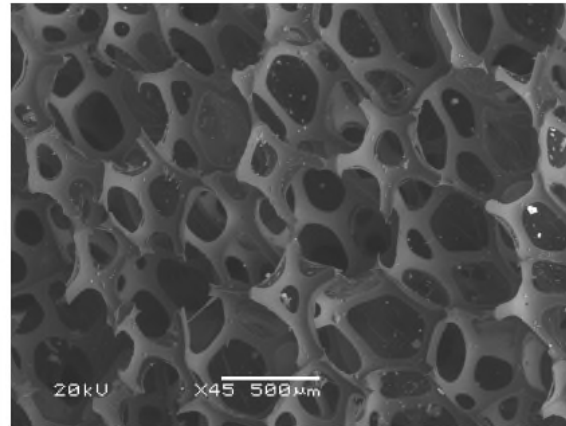


Figure 13 – SEM micrographs of RJLG# 10536805A.

RJ Lee #10536805 – Sample from  
production part (light area)  
Ref. Page 15 of RJ Lee Report

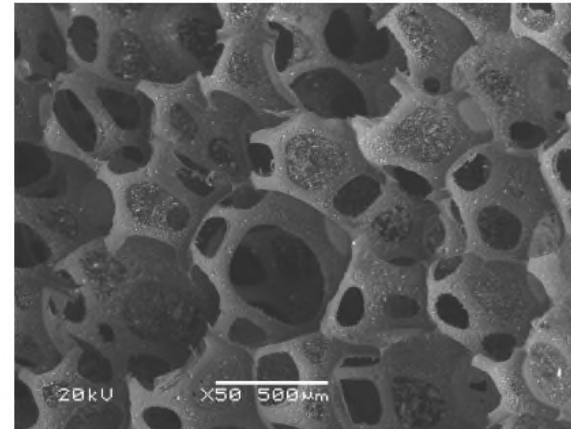


Figure 15 – SEM micrographs of RJLG# 10536805B.

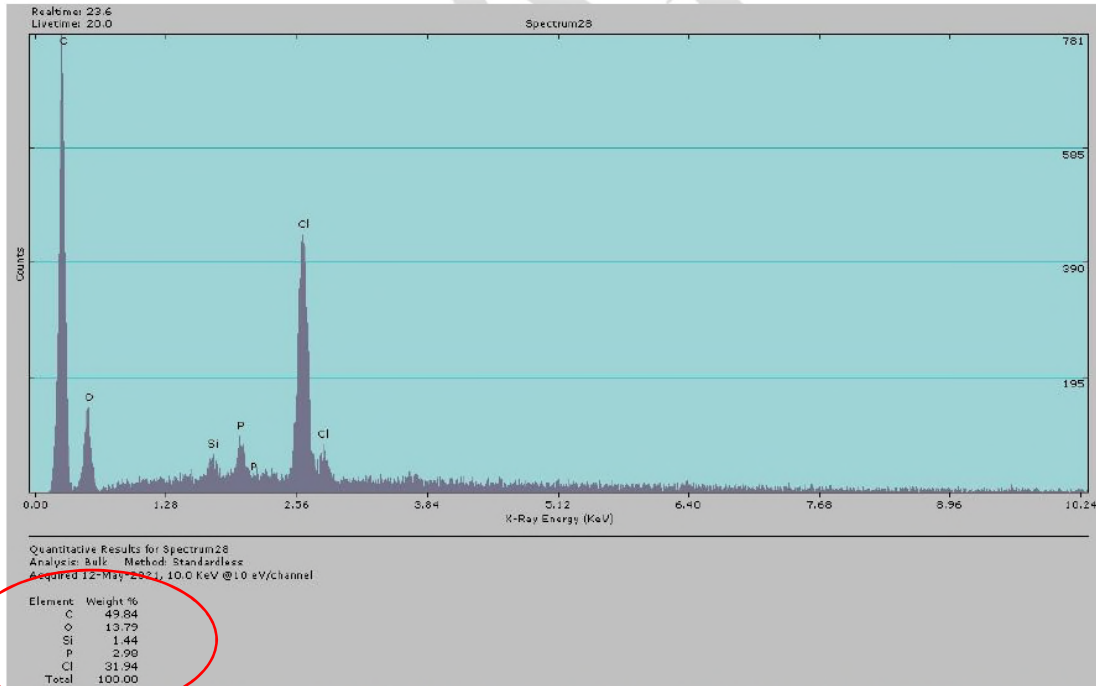
RJ Lee #10536805 – Sample from  
production part (dark area)  
Ref. Page 17 of RJ Lee Report

Note differences in cell structure within the same part. The darker region appears to have “unpopped” bubbles with significant contaminants.

# RJ Lee Report Summary

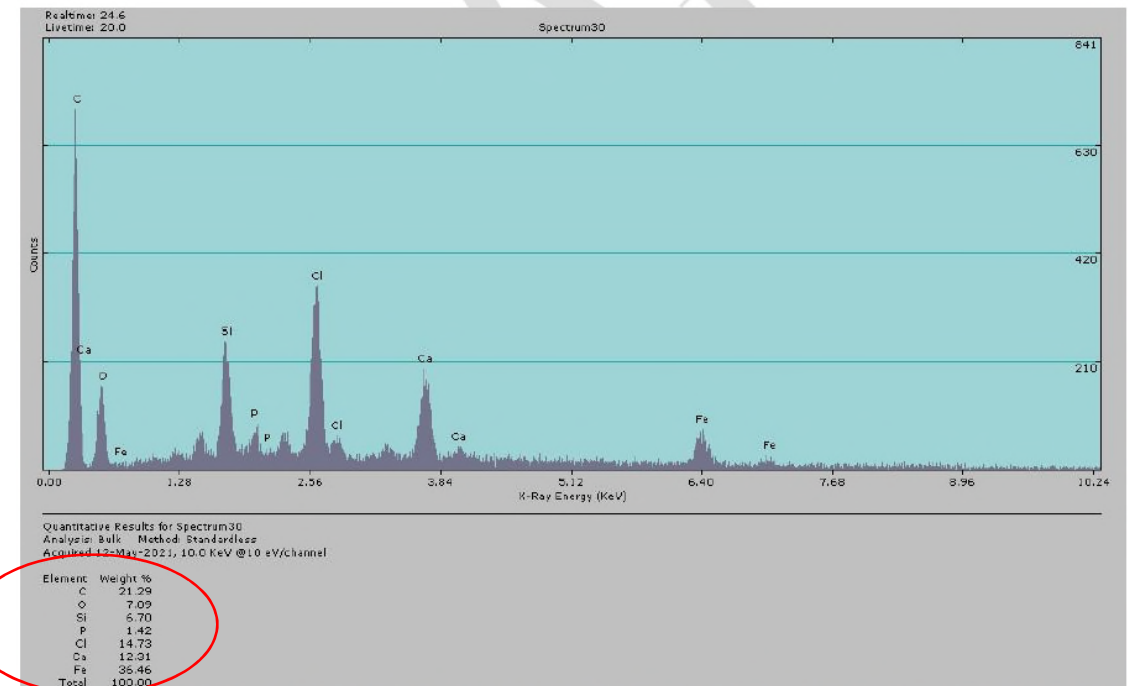
*SEM-EDS Comparison 1126745 Two-Tone Production Part*

Significant differences in composition of elements within the same piece. Indication of poor process control and/or contamination.



**Figure 12** – SEM-EDS analysis of RJLG# 10536805A. Top: SEM micrograph. White box shows area of EDS analysis. Bottom: EDS analysis showing elemental constituents of the sample.

RJ Lee #10536805 – Sample from  
production part (light area)  
Ref. Page 14 of RJ Lee Report



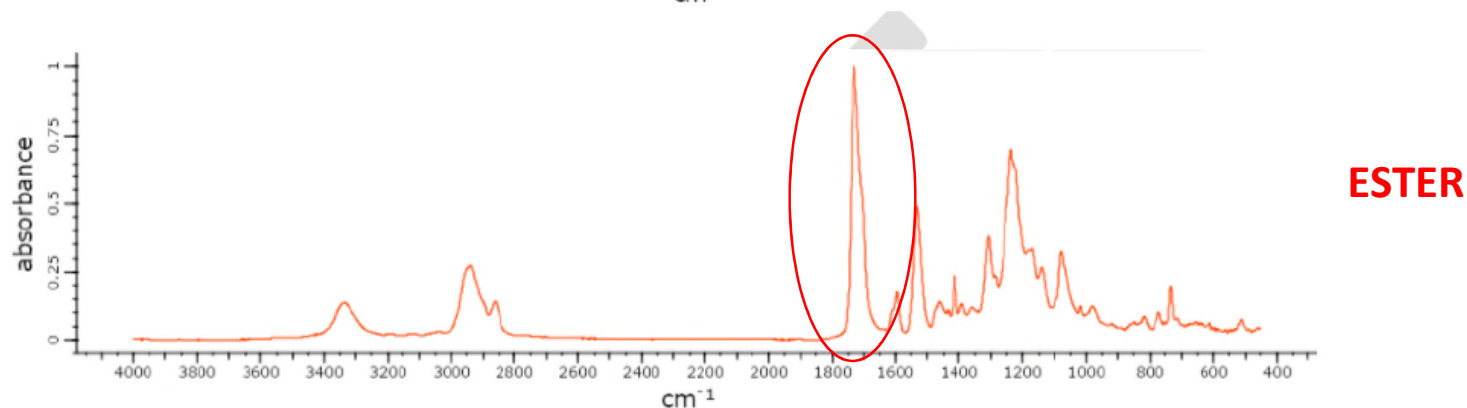
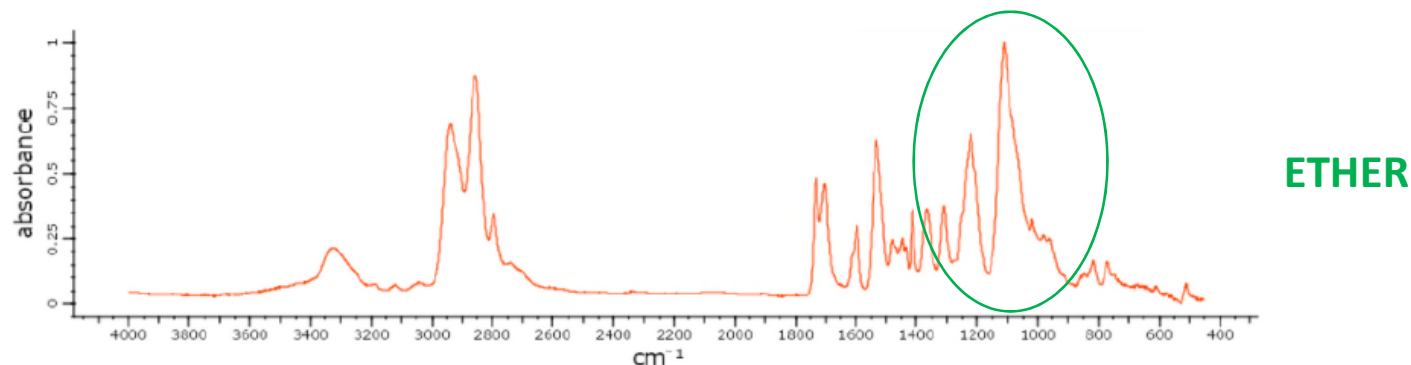
**Figure 14** – SEM-EDS analysis of RJLG# 10536805B. Top: SEM micrograph. White box shows area of EDS analysis. Bottom: EDS analysis showing elemental constituents of the sample.

RJ Lee #10536805 – Sample from  
production part (dark area)  
Ref. Page 16 of RJ Lee Report

# RJ Lee Report Summary

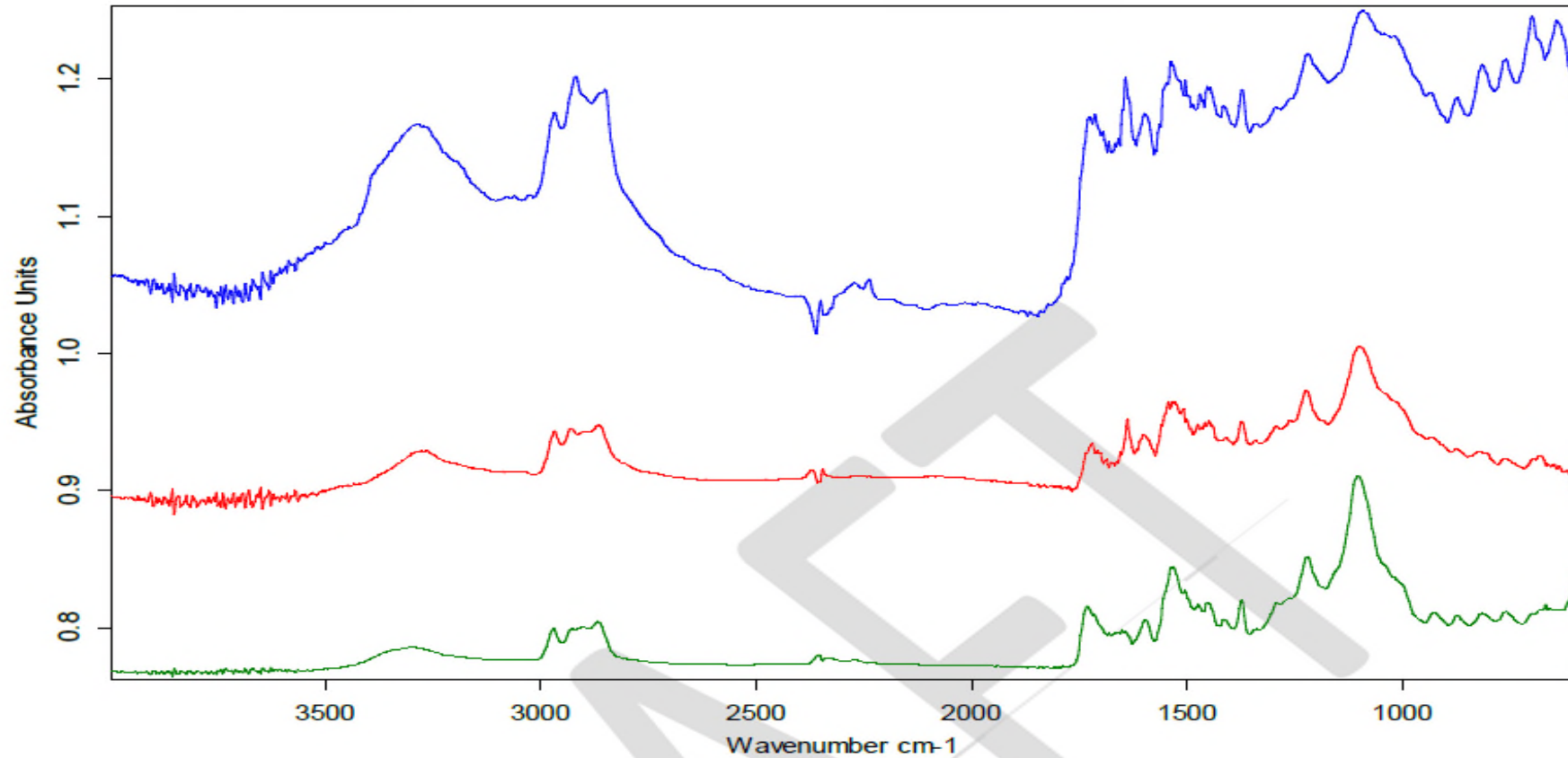
## FTIR Analysis

- Analysis to determine **ester** or **ether** based polyurethane foam.
  - **Ether** based foam will have a large, broad peak at  $\sim 1100\text{ cm}^{-1}$ , while an **ester** based polyurethane will have a large, sharp peak at  $\sim 1740\text{ cm}^{-1}$ .



# RJ Lee Report Summary

*FTIR Analysis – 1126743 Samples*



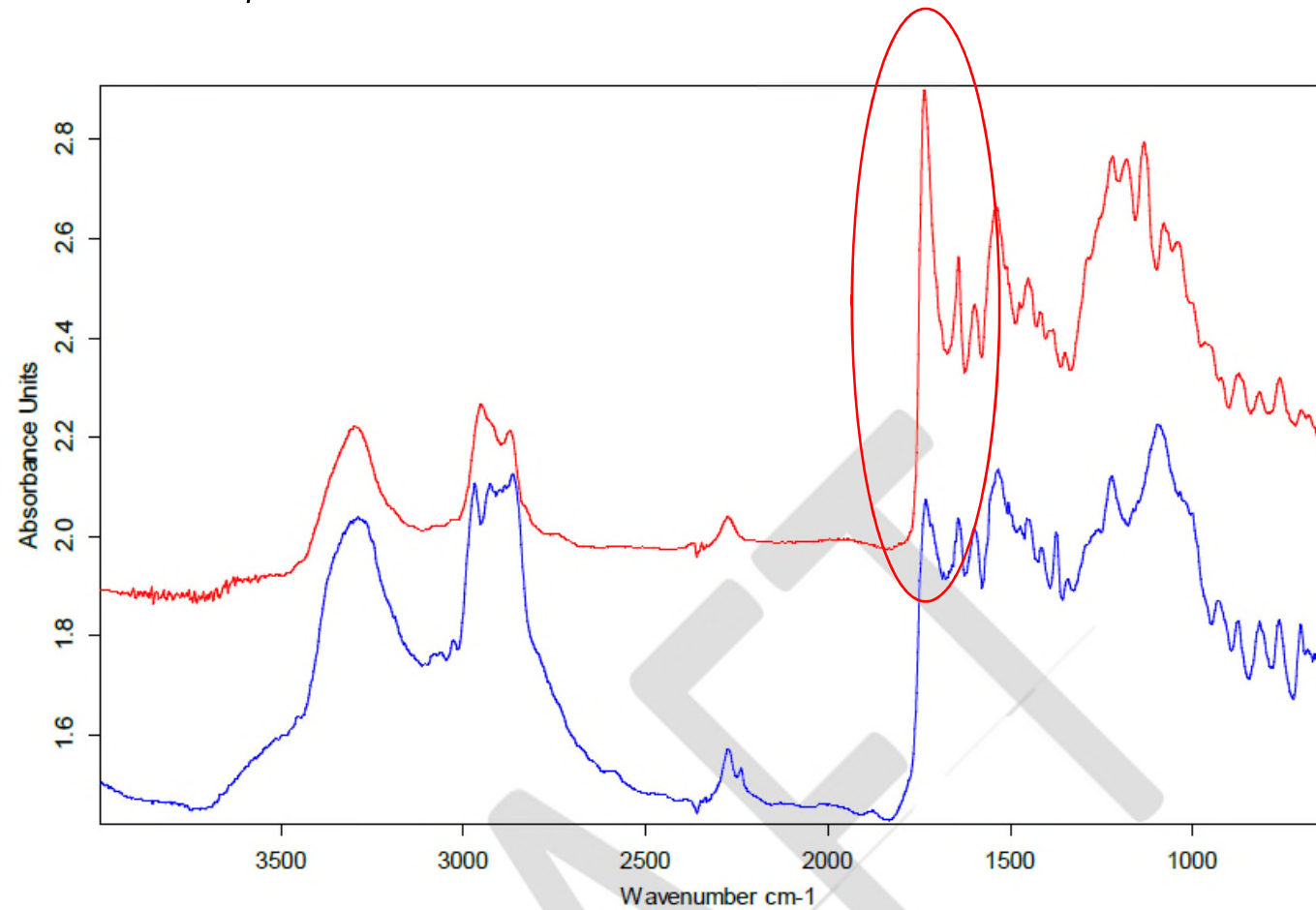
P:\TMHData\1061930\ATR Data\10536800 ATR.0	Older 2018 1126743	TMH1061930 10536800 ATR	11/05/2021
P:\TMHData\1061930\ATR Data\10536801 ATR.1	New 5-6-2021 1126743	TMH1061930 10536801 ATR	11/05/2021
P:\TMHData\1061930\ATR Data\10536802.0	RTD 1126743	10536802	12/05/2021



# RJ Lee Report Summary

FTIR Analysis – 1126746 Samples

Indication of an **ester-based** foam!



P:\TMHData\1061930\ATR Data\1053683.0	10536803	New Lightrer 5-6-2021 1126746	12/05/2021
P:\TMHData\1061930\ATR Data\reflection\10536804.0	10536804	New Darker 5-6-2021 1126746	12/05/2021

# Next Steps

1. Engage RJ Lee for further FTIR analysis.
  - Provide 3 to 5 samples of each part number. Suggest taking from random lots (while lot tracking is only to Paramount). Suggest weighting the samples more towards the darker colors.
  - Have RJ Lee notify immediately if any other samples are found to be ester-based foams.
2. Engage supply chain to better understand controls and potential for Philip's to receive non-conforming parts (material)
3. Kick off design efforts for alternate, sound abatement proposals.

Product	Trilogy EVO	Trilogy EVO	Trilogy EVO	Trilogy EVO
Foam P/N per the list.	1126743	1126744	1126745	1126746
Description	MUFFLER FOAM TOP, HELIX	MUFFLER FOAM MID, HELIX	MUFFLER FOAM MAIN, HELIX	MUFFLER FOAM BASE, HELIX
Tier 1 Supplier (one that ships to RIMR)	Paramount Die	Paramount Die	Paramount Die	Paramount Die
Tier 2 supplier (Die Cut)	Paramount Die	Paramount Die	Paramount Die	Paramount Die
Tier 3 supplier (Skiving)	Polymer Tech	Polymer Tech	Polymer Tech	Polymer Tech
Tier 4 supplier (Raw Material)	William T Burnett	William T Burnett & FXI	William T Burnett	William T Burnett & FXI
Raw Material Type	PAF-038-BU	PAF-050-BU	PAF-025-BU	PAF-038-BU
Foam Adhesive (Y/N)	N	N	N	N
Is this <b>dual sourced at any tier?</b>	N	Y	N	Y
What activity is dual sourced: 1) Raw Material 2) Skiving 3) Die Cut 4) Foam Adhesive, Glue	1) NO 2) NO 3) NO 4) NO	1) YES 2) NO 3) NO 4) NO	1) NO 2) NO 3) NO 4) NO	1) YES 2) NO 3) NO 4) NO
Second Source				
<b>If raw material is dual source- Supplier #2.</b>	N/A	FXI	N/A	FXI